

## CX-PRN160D Pirani Vacuum Gauge Instructions



## 1. External interface description

The rear panel external interface socket is DBSub-9 female socket, Provide RS485 communication、 Analog voltage output

stitch	Features	stitch	Features
<b>Pin 1</b>	RS485 D-	<b>Pin 2</b>	NC
<b>Pin 3</b>	NC	<b>Pin 4</b>	GNDA
<b>Pin 5</b>	Channel 1 analog output	<b>Pin 6</b>	RS485D+
<b>Pin 7</b>	NC	<b>Pin 8</b>	NC
<b>Pin 9</b>	Channel 2 analog output		

## 2. Analog voltage output and calculation formula:

The corresponding relationship between the analog voltage output and the pressure of the pressure signal corresponding to the two channels is as follows:

$$P=10^{((U-c)/1.286)} \quad \longleftrightarrow \quad U=c+1.286 \times \lg P$$

Where **P** : Pressure  
**U** : Voltage (V)  
**C** : Constant  
(Pressure Unit Dependent)

U	P	C
(V)	Pa	3.572
(V)	mBar	6.143
(V)	Torr	6.304

### 3. Key operation instructions

#### PRN-160D Double row display two-way Pirani vacuum gauge

MENU Button Cycle	Segment Code Display	">" Button	"^" Button	"CNAN" Button
Press 1 time	ATP1	Press to perform channel 1, atmospheric pressure, calibration	NA	NA
Press 2 times	ATP2	Press to perform channel 2a atmospheric pressure, calibration	NA	NA
Press 3 times	HUC1	Press to perform channel 1, lower limit, calibration	NA	NA
Press 4 times	HUC2	Press to perform channel 2a lower limit, calibration	NA	NA
Press 5 times	SP1	Relay S1, control point setting digit selection (right and circular)	Relay S1, control point setting, set current bit code digital selection (0-9 cycle)	Select SP1, assign to channel 1 or channel 2
Press 6 times	SP2	Relay S2 control point setting digit selection (right and circular)	Relay S2, control point setting current bit code digital selection (0-9 cycle)	Select SP2, assign to channel 1 or channel 2
Press 7 times	SP3	Relay S3 control point setting digit selection (right and circular)	Relay S3, control point setting current bit code digital selection (0-9 cycle)	Select SP3, assign to channel 1 or channel 2
Press 8 times	SP4	Relay S4 control point setting digit selection (right and circular)	Relay S4, control point setting current bit code digital selection (0-9 cycle)	Select SP4, assign to channel 1 or channel 2
Press 9 times	U	Press to cycle through display unit options: Pa/Torr/mBar	NA	NA
Press 10 times	d	Press to display the digital tube Display format.S: scientific notation:n: floating point	NA	NA
Press 11 times	A	MO, BUS access setting digits, select (right and circular)	MODBUS current digit selection (0-9)	NA
	a			

## 4. RS485 MODBUS RTU Communication protocol

### 1) Communication Setup:

baud rate: 9600  
 Start Bit: 1  
 Data Bit: 8  
 Stop Bit: 1  
 Checkout bit: No

### 2) Instruction format:

#### a. Read instruction:

- Upper computer sends instructions to vacuum gauge:

Add	Com man d	Register Hi	Regist er Low	Data Length (Hi 8bit)	Data Length (Low 8bit)	CRC Check (Low 8bit)	CRC Check (Hi 8bit)
0-99	03	00	XX	00	XX	XX	XX

- Return Instruction:

Add	Com man d	Data Hi 8 Bit	Data Low 8 Bit	Data	CRC Check (Low 8bit)	CRC Check (Hi 8bit)
0-99	03	00	XX	XX Byte	XX	XX

#### b. Write Instruction:

- Upper computer sends instructions to vacuum gauge:

Add	Com mand	Register Hi	Register Low	Data Length (Hi 8bit)	Data Length (Low 8bit)	Data Byte	Highest Data Byte
0-99	16	00	XX	00	02	4	Bit31-24

● Return Instruction:

Add	Com mand	Register Hi	Register Low	Data Length (Hi 8bit)	Data Length (Low 8bit)	CRC Check (Low 8bit)	CRC Check (Hi 8bit)
0-99	16	00	XX	00	02	XX	XX

3) Register address table:

Register address (16hexadecimal)	Data byte length	Storage content
01	2	Gauge Ch1: Vacuum data of scientific counting format
03	2	Gauge CH2: Vacuum data of scientific counting format
11	2	Gauge Ch1: Vacuum data of floating point format
13	2	Gauge CH2: Vacuum data of floating point format
21	2	Set Point 01: Floating Format
23	2	Set Point 02: Floating Format
25	2	Set Point 03: Floating Format
27	2	Set Point 04: Floating Format
29	2	Set Point 05: Floating Format

Data Mid Byte	Data Mid Byte	Data Mid Byte	CRC Check (Low 8bit)	CRC Check (Hi 8bit)
Bit23-16	Bit15-8	Bit7-0	XX	XX
2B	2	Set Point 06: Floating Format		
31	1	Set Point 01 correspond Gauge Ch2	1: Gauge Ch1; 2: Gauge Ch2	
32	1	Set Point 02 correspond Gauge Ch2	1: Gauge Ch1; 2: Gauge Ch2	
33	1	Set Point 03 correspond Gauge Ch2	1: Gauge Ch1; 2: Gauge Ch2	
34	1	Set Point 04 correspond Gauge Ch2	1: Gauge Ch1; 2: Gauge Ch2	
35	1	Set Point 05 correspond Gauge	1: Gauge Ch1; 2: Gauge	

		Ch2
36	1	Set Point 06 correspond Gauge 1: Gauge Ch1; 2: Gauge Ch2
40	1	Implement Calibration: 1: Gauge Ch1 atmosphere 2: Gauge Ch1 Zero 4: Gauge Ch2 atmosphere 8: Gauge Ch2 Zero

#### 4.1 Data display format:

##### 4.1.1 Scientific count format:

For example, the vacuum gauge display data is 1.2E+3, and the ASCII code stored in the register is the corresponding data, that is, 0x31, 0x32, 0x2b, 0x33.

For example, the vacuum gauge displays the data 1.0E-1, and the data stored in the register are 0x31, 0x30, 0x2d and 0x31.

##### 4.1.2 Floating format:

The 32 bit floating number is stored in the register.

##### 4.1.3 Vacuum gauge address setting:

Through Gauge Reader 3.0 application software interface, you can set the vacuum meter local address, factory address set to 01.